
TOX3 regulates calcium-dependent transcription in neurons.

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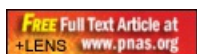
Public Summary:

Learning is an essential component of the human brain function. The molecular basis of learning depends on the rapid and stringent regulation of gene expression. We characterized a new member, TOX3 (high mobility box family member 3) of the activity-dependent transcription regulators. We found that TOX3 is activated by calcium and regulates the activation of the immediate early gene, Fos. The implication our work is the discovery of a new regulator in learning and memory.

Scientific Abstract:

We report the cloning and characterization of TOX3, a high mobility group box protein involved in mediating calcium-dependent transcription. TOX3 was identified as a calcium-dependent transactivator using the Transactivator Trap screen. We find that TOX3 interacts with both cAMP response element (CRE)-binding protein (CREB) and CREB-binding protein (CBP), and knockdown of the endogenous TOX3 by RNAi leads to significant reduction of calcium-induced c-fos expression and complete inhibition of calcium activation of the c-fos promoter. The effects of TOX3 on calcium-dependent transcription require the CRE elements. These observations identify TOX3 as an important regulator of calcium-dependent transcription and suggest that TOX3 exerts its effect on CRE-mediated transcription via its association with the CREB-CBP complex.

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